

REMARKS

Claims 1 through 19 are in the application, with claims 11 through 14 withdrawn from consideration. Of the claims currently under consideration, claims 1, 3, 5, 6, 8, 9, 15 and 16 are amended. Claims 1, 8 and 15 are the independent claims herein. Support for the amendments to claims 1, 3, 5, 6, 8, 9, 15 and 16 can be found at least on page 4, line 6, to page 5, line 20 of the present Application. No new matter has been added. Reconsideration and further examination are respectfully requested.

The drawings have been objected to by the Office Action under 37 CFR 1.83(a) for failing to disclose "underfill material," such as was claimed in claim 9 prior to amendment. Applicant amends claim 9 to now recite "die attach material" instead of "underfill material." Applicant requests that the objection to the drawings be withdrawn.

Claims 1-6 are rejected under 35 USC 102(b) as being anticipated by U.S. Publication No. 2002/0135057 ("Kurita"); claim 7 is rejected as being unpatentable under 35 USC 103(a) over Kurita in view of U.S. Patent No. 5,422,435 ("Takiar"); claims 8 and 9 are rejected as being unpatentable over U.S. Patent No. 5,040,052 ("McDavid") in view of Kurita; claim 10 is rejected as being unpatentable over McDavid in view of Kurita further in view of Takiar; claims 15-17 and 19 are rejected as being unpatentable over Kurita in view of U.S. Publication No. 2002/0196650 ("Chang"); and claim 18 is rejected as being unpatentable over Kurita in view of Chang further in view of Takiar.

Claims 1 and 15

Claim 1 concerns an apparatus having an integrated circuit die that is coupled to an integrated circuit package. Mold compound is in contact with the integrated circuit die and the integrated circuit package. An interconnect is coupled to the integrated circuit package. A first portion of the interconnect is in contact with the mold compound. A second portion of the interconnect is not in contact with the mold compound. The mold compound defines an opening, and the second portion of the interconnect is recessed beneath the opening. A third portion of the interconnect is in contact with the integrated circuit package.

In one embodiment, and further illustrated is FIG. 1 of the present Application, interconnects 18 are recessed beneath an opening in mold compound 19, and the opening may

receive solder balls 28. Such an arrangement may provide packages of less vertical height than previously available. More particularly, the present Application states:

"Mold compound 19 defines openings through which solder balls 28 may contact interconnects 18. As a result of the foregoing arrangement, a first portion of at least one of interconnects 18 is in contact with mold compound 19, a second portion is not in contact with mold compound 19, and a third portion is in contact with IC package 10." (Page 4, lines 23-29.)

The art of record is not seen to disclose or suggest the features of claim 1. In particular, the cited art is not seen to disclose or suggest mold compound defining an opening, in which a second portion of an interconnect is not in contact with the mold compound and is recessed beneath the opening.

Rather, Kurita is directed to a semiconductor device. In Kurita, end surfaces of conductive posts are exposed from insulating resin and are used as first planar electrodes, wherein the "height of conductive posts 6 is *equal* to the height of the rear surface of IC chip 1 that is arranged on the same surface 3a of wiring layer 3." (Page 2, paragraph 30). (Emphasis added). As is illustrated in FIG. 3 of Kurita, solder resist layer 9 is disposed on top of conductive posts 8, wherein the conductive posts 8 are at least of the same height as the insulating resin 7.

Kurita, therefore, cannot be seen to disclose or suggest mold compound defining an opening, in which a second portion of an interconnect is not in contact with the mold compound and is recessed beneath the opening.

Amended claim 1 and its associated dependent claims are therefore believed to be allowable.

Amended Claim 15 also concerns mold compound defining an opening, in which a second portion of an interconnect is not in contact with the mold compound and is recessed beneath the opening. Claim 15 was rejected over Kurita in view of Chang. As Chang is not seen to remedy the above-described deficiencies in Kurita, Claim 15 and its dependent claims are also believed to be allowable.

Claim 8

Claim 8 concerns an apparatus that has an integrated circuit package substrate. A plurality of integrated circuit dies are coupled to the integrated circuit package substrate. A mold compound is in contact with the plurality of integrated circuit dies and the integrated circuit package substrate. An interconnect is coupled to the integrated circuit package substrate. The interconnect is also electrically coupled to one of the plurality of integrated circuit dies. A first portion of the interconnect is in contact with the mold compound. A second portion of the interconnect is not in contact with the mold compound. The mold compound defines an opening. The second portion of the interconnect is recessed beneath the opening. A third portion of the interconnect is in contact with the integrated circuit package substrate.

McDavid is not seen to disclose or to suggest at least mold compound defining an opening, in which a second portion of an interconnect is not in contact with the mold compound and is recessed beneath the opening. Rather, in McDavid, "boards 11 are stacked without space between them, one surface of each board is in contact [with] the DRAMS mounted on the board below it. In this manner, each board 11 provides heat transfer and substrate electrical contact for the DRAMS mounted on the board mounted below it." (Column 3, lines 6-11). As described above, Kurita also fails to disclose or suggest at least the foregoing feature of amended Claim 8. Claim 8 and all claims depending therefrom are believed to be in condition for allowance.


CONCLUSION

The outstanding Office Action presents a number of characterizations regarding each of the applied references, some of which are not directly addressed herein because they are not related to the rejections of the independent claims. Applicants do not necessarily agree with the characterizations and reserve the right to further discuss those characterizations.

For at least the reasons given above, it is submitted that the entire application is in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience. Alternatively, if there remains any question regarding the present application or any of the cited references, or if the Examiner has any further suggestions for expediting allowance of the present application, the Examiner is cordially requested to contact the undersigned via telephone at (203) 972-0049.

Respectfully submitted,

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Date



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